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Investigations on Effect of Cutting Parameters on Performance of Wire EDM on Titanium Grade 5 Alloy Using Analysis of Variance Software (ANOVA)

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Abstract - Wire-cut Electrical discharge machining process (WEDM) also known as wire-cut edmis frequently used when machining of complex shapes are required. Indeed, it is specially recommended for extremely hard materials and very small work pieces that would be otherwise difficult to machine with conventional cutting tools. There is no direct contact between tool and work piece and therefore delicate sections and weak materials can be machined without any distortion. However, due to the process nature, there is still incomprehension on process parameters influence at the final quality features, ending up by lower productivity and quality ratios. Therefore, in order to increase the global WEDM process productivity, quality and flexibility capable to machine different features must be found. This study presents the influence of the main WEDM process parameters on basic process performance measures. A set of designed experiments with varying parameters such as pulse time, current, wire tension, servo voltage and wire speed are carried out in titanium grade 5 using brass wire. In addition, material removal rate, wire offset and surface roughness are analyzed through statistical methods. Results help us to select appropriate WEDM process parameters to machine parts depending on product requirements and also to predict outputs.